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Introduction and Scope

This handout is intended for use as a guideline on the maintenance and repair of existing ceilings. Ceilings installed previous to the adoption of the 2003 International Building Code (IBC) are to be maintained to the 1997 Uniform Building Code (UBC). Ceilings installed under the IBC are to be maintained under the IBC in affect at the time of the installation. This handout does not address the specifics of any above ceiling fire-stopping, or other building systems which may be inspected in conjunction with ceiling inspections.

The architect/designer needs to perform a thorough evaluation of the existing ceiling system with a ceiling contractor or ceiling specialists prior to submitting for a permit and prior to putting the job out to bid. Review and approval by a qualified design professional is necessary because there are so many aspects of the integration of new products into existing building systems that are uniquely within the scope of responsibility of the architect and construction manager. These include all structural issues, fire protection, and aesthetics, among many others. The manufacturer will typically not undertake liability for incidental and consequential damages, directly sustained, nor for any loss caused by application of their goods not in accordance with current printed instructions or for other than the intended use. All of the conditions, remedies, and specifications must be reviewed and completely evaluated by the owner's design professional to verify the suitability of a design for a given structure.

For suspended ceiling assemblies, you must provide the original assembly by which the original ceiling was installed and maintain/repair accordingly. If this is not possible, there are 4 options available for the maintenance/repair and subsequent inspection of existing ceiling systems:

1. Provide an alternate ceiling system that closely matches the on-site conditions, type of construction, and rating. Submit this system as a revision to the approved plan.
2. Maintain/repair the suspended ceiling system as detailed in the Existing Ceiling Checklist. (See Attached)
3. Submit an Alternate Methods and Materials form detailing and justifying a alternate system design which meets or exceeds the code requirements in effect at the time of the original installation. This form must be submitted to the Building Official of the City of Bellevue for review and approval prior to the installation.
4. Install the suspended ceiling system as required by the current Building Code in effect at the time of permit application. A revision may be required for this option.

Inspections

Ceiling inspections will cover any work in or below the ceiling in the room or area being worked on and may include areas of the ceiling within 6 ft. of the permitted scope of work having a direct affect on the ceiling system. Upgrades may be triggered depending on the condition of the ceiling system in these areas. Examples of this work include but are not limited to:

- The addition or relocation of light fixtures.
- The addition or relocation of mechanical diffusers and/or dampers directly connected to the ceiling system.
- The addition or removal of partition walls, soffits, etc.
- The addition, removal or reconfiguration of the suspended ceiling grid and/or the support system, having a direct effect on the ceiling system.

Other items beyond the 6 ft. permitted scope which can be incorporated into current inspection and permit scoping based on the inherent level of danger they present.

- Firestopping incomplete at horizontal or vertical exit enclosures within or immediately adjacent to the space.
- Tenting on lights incomplete at rated ceiling assemblies.
- Lights installed with no slack wires.
- Perimeter wires not installed.
- Radiation dampers not installed in rated ceiling HVAC penetrations.

The 6 ft. rule may also be applied to common areas adjacent to the tenant space, such as corridors, restrooms, etc., where a serious and obvious life safety threat is present. Full upgrades in these types of neighboring areas are not required unless it is determined that the ceiling was never installed legally per the code in effect at the time of installation, that the ceiling condition has not been maintained, that the ceiling has been damaged to such an extent that it no longer meets the intended design and installation requirement in effect at the time of the installation, or that the modifications to the ceiling have compromised the overall integrity of the ceiling as it was originally designed to perform.

Triggers for Ceiling Upgrades

Items which qualify as a trigger for full ceiling upgrade:

- Suspension wires not installed per typical system requirements current or in affect at the time of the initial installation.
- Unrated ceiling system installed when rated system is required.
- Where a tenant improvement involves work in a substantial portion of the area ceiling.
- Ceiling system which was installed which did not meet code requirements in effect at the time of the initial installation.
- Replacement of ceiling tile as part of an overall tenant improvement.

Items not qualifying for a full ceiling upgrade:

- Replacement of ceiling tiles.
- Installation of mechanical, electrical, plumbing, or fire systems not connected directly to the suspended ceiling system. (Where work is done which affects, alters or degrades the ceiling system a building permit is required.)
- Ceilings installed without vertical struts, providing the splay wires are installed in a 12' x 12' layout. (The City of Bellevue had allowed, in the past, the strut portion of the seismic pod to be omitted. A ceiling installed and approved in that manor would not trigger a ceiling upgrade.)

EXISTING CEILING SYSTEM CHECKLIST

Scope

The focus of this checklist is to address those items which can create a threat to life safety such as fire, falling or servicing hazards. For fire-rated ceiling assemblies, you must provide the original assembly by which the original ceiling was installed and maintain/repair accordingly. If this is not possible, this checklist can be used as one of four options available for the maintenance/repair and subsequent inspection of existing ceiling systems:

Wall Molding

- ☐ The ceiling grid must be attached to the molding at two adjacent walls.
- ☐ Unattached ends of the grid system must have $\frac{3}{4}$ " clearance from the wall, and must rest upon and be free to slide on the molding.

Perimeter Support

- ☐ Terminal ends of each main beam and cross tee are supported within 8" of each wall or ceiling discontinuity with 12 gage wire or approved wall support.
- ☐ These wires are plumb to within one in six and may attach to the adjacent wall structure or ceiling structure above grid.

Suspension System

- ☐ Cross tees supporting light fixtures or mechanical services must have a load carrying capacity of ≥ 8 lbs/LF if installed under the UBC and ≥ 16 lbs/LF if installed under the IBC, or be supported with supplemental hanger wires within 3" of intersection. (See light fixtures and mechanical services for additional information)
- ☐ Suspension wires are minimum 12 gage and spaced at 4' or 10 gage at 5'.
- ☐ Hanger wire attached devices must be capable of supporting 100 lbs.
- ☐ Connections at main beam and at structure are secured with a minimum of (3) complete turns within 3".
- ☐ Suspension wires are installed at each side of main runner breaks.

Lateral Force Bracing

- ☐ Ceilings installed prior to the 2003 IBC code in areas greater than 144 sq.ft. must have lateral force bracing. Exception: Those ceilings previously installed and approved without seismic struts per the City of Bellevue policy in affect at the time of the install will not be required to have struts added.
- ☐ Seismic strut dimensions are per attached Table 1.
- ☐ Rigid bracing may be used instead of diagonal splay wires.
- ☐ Splay wire bracing shall be clusters of four 12 gage wires within 2" of the cross tee intersection.
- ☐ Wires are arrayed 90 degrees from each other at an angle not exceeding 45 degrees from the plane of the ceiling. Wires do not have to run parallel to mains or cross tees.
- ☐ Horizontal restraint points (seismic pods) shall be no more than 12' on center in each direction, and the first point shall be within 6' of each wall.

Penetrations of Rated Grid Ceilings

- ☐ Ceiling penetrations are fire-stopped above the grid at the tile penetration(s), including but not limited to those originating from partition walls.
- ☐ Cut tiles are secured in place with ceiling tile clips or other approved methods

Ducting: (See also Mechanical Services)

- ☐ Maximum duct openings 100sqin/100sqft.
- ☐ Duct openings protected with fire dampers.
- ☐ Four 12 gage wires connected from structure to corners of diffuser housing.

Lights: (See also Light Fixtures)

Spacing

- ☐ 1x4 lights: max 4/100ft.
- ☐ 2x2 lights: max 5/100ft.
- ☐ 2x4 lights: max 5/100ft.

Noncombustible Construction: Rated Ceilings

- ☐ Can lights, speaker boxes and/or other similar equipment protected with (5) sided box constructed from 5/8" drywall. Corners of box pinned together with metal corners and drywall screws. Corners of box are fire-taped and penetrations fire-caulked when installed in rated corridors or exit passageways.
- ☐ 2'x2' – 2'x4' steel housed fluorescent lights protected with like sized 5/8" drywall or rated tile on 1 1/4" spacers over light housing. Exception: Lights installed in tandem are to be protected as detailed in the next section under Combustible Construction.
- ☐ Four 12 gage hanger wires installed at the four corners of the light housing.
- ☐ When cross tees intersect the fixture mid-point, install two 12 gage hanger wires.
- ☐ Install 12 gage hanger wires at each side of main runner joints.

Combustible Construction: Rated Ceilings

- ☐ Can lights protected with (5) sided box constructed from 5/8" drywall. Corners of box pinned together with metal corners and drywall screws. Corners of box are fire-taped and penetrations fire-caulked when installed in rated corridors or exit passageways.
- ☐ 2'x2' – 2'x4' steel housed fluorescent lights protected with 5/8" drywall or rated tile, cut and fit to form a (5) sided box around fixture. 1 1/4" space(rs) at top over top of housing to protection. Pieces pinned together with 5d nails or equivalent. Allow 1" air space along each narrow end for heat dissipation.
- ☐ When cross tees intersect the fixture mid-point, install two 12 gage hanger wires.
- ☐ Install 12 gage hanger wires at each side of main runner joints.

Light fixtures (Requirements are in addition to those listed under Rated Grid Ceilings)

- ☐ All fixtures must be positively attached to the suspension system.
- ☐ Cross runners supporting the ends of lighting have minimum carrying capacity of 16 lbs./LF for IBC ceilings and 8 lbs./LF for UBC ceilings, or require supplemental 12 gage hanger wires attached to the grid members within 3" of each corner of each fixture supported by a cross tee.

- ☐ Fixtures weighing 56 lbs or less must have two 12 gage wires attached at diagonal corners, and these wires may be slack. Fixtures weighing in excess of 56 lbs must be independently supported from the building structure.
- ☐ Pendant mounted fixtures must be supported directly from the structure using 9 gage wire. The ceiling suspension system may not be used for support.

Mechanical Services (These requirements are in addition to those listed under Rated Grid Ceilings)

- ☐ Must be positively attached to the suspension system main beams or to cross tees with the same load carrying capacity.
- ☐ Cross tees supporting mechanical services have minimum carrying capacity of 16 lbs./LF for IBC ceilings and 8 lbs./LF for UBC ceilings, or require supplemental hanger wires within 3" of each corner of each fixture supported by the cross tee*. (*The City of Bellevue has determined that it is acceptable practice to apply the same supplemental wire application, as is allowed for light fixtures, to mechanical services in addition to the requirements in the Mechanical Services portion of this checklist.)
- ☐ Terminals or services weighing 20 lbs to 56 lbs must have two 12 gage wires connecting them to the ceiling system hangers or to the structure above.
- ☐ Terminals or services weighing more than 56 lbs must be independently supported.
- ☐ Maintain required working clearances as required by mechanical, electric, and plumbing codes.

Partition Attachment

- ☐ Partitions attached to the ceiling suspension system shall be laterally braced to the building structure. This bracing is to be independent of any ceiling's splay wire bracing.
- ☐ Exception: Partitions not taller than 9' as long as the horizontal seismic load does not exceed 5 lbs per square foot.

Height Transitions

- ☐ Changes in ceiling plane elevation must have positive bracing.

Plenums

- ☐ No combustibles in plenums used for return air. Plastic plumbing pipe, insulation with exposed facing, nonfire-resistant treated wood, etc.

Miscellaneous

- ☐ Remove construction debris and unused items from the ceiling including, but not limited to wires, wall bracing, mechanical, electrical, plumbing, etc.

Electrical Wiring, Conduits and Cable Trays

- ☐ Electrical wiring cable trays and electrical conduits are independently supported and braced independently of the ceiling.
- ☐ VAVs and other similar electrical disconnects require a clear working space of 30" wide x 36" deep for existing equipment. Install removable cross tees and label them "Removable Cross Tee", where installed within the clear working space.
- ☐ New walls or ceiling modifications don't encroach on working clearance.

Maximum Compression Strut Lengths

TABLE 1
MAXIMUM COMPRESSION STRUT LENGTHS
FOR 180 LB. SEISMIC LOAD

| | |
|---|------|
| $\frac{3}{4}$ " X $\frac{1}{2}$ " X 0.059" CHANNEL | 26" |
| 1 $\frac{1}{2}$ " X 9/16" X 0.059" CHANNEL | 33" |
| (2) $\frac{3}{4}$ " X $\frac{1}{2}$ " X 0.059" CHANNEL, BACK TO BACK | 39" |
| (2) 1 $\frac{1}{2}$ " X 9/16" X 0.059" CHANNEL, BACK TO BACK | 44" |
| 1 $\frac{5}{8}$ " X 1 $\frac{1}{4}$ " X 0.0197" CHANNEL | 106" |
| (2) 1 $\frac{5}{8}$ " X 1 $\frac{1}{4}$ " X 0.0197" CHANNEL, BACK TO BACK | 141" |
| $\frac{1}{2}$ " Diameter EMT Conduit, 0.042" Wall Thickness | 47" |
| $\frac{3}{4}$ " Diameter EMT Conduit, 0.049" Wall Thickness | 61" |
| 1" Diameter EMT Conduit, 0.057" Wall Thickness | 78" |
| 1 $\frac{1}{4}$ " Diameter EMT Conduit, 0.065" Wall Thickness | 102" |
| 1 $\frac{1}{2}$ " Diameter EMT Conduit, 0.065" Wall Thickness | 118" |
| Taller struts require engineering. | |